

# **AN INFORMATION SHORE IN THE PACIFIC: MEXICO`S NETWORKING INFRA-STRUCTURE**

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## **ABSTRACT**

Despite of Mexico's economic slowdown of the last two decades, its information infra-structure has evolved at a good pace. The public library system increased the number of libraries by threefold. Several university libraries built new facilities and computer-ization has taken place with resources provided by FOMES, a special fund devoted to them by the Ministry of Public Education. Telecommunications, on the other hand, are growing fast with the opening of the state monopoly to foreign investment.

Mexico has become one of the five leading nations in wireless communication. A second generation of satellites have been launched and computer networking has increased connectivity. Some universities have national computer networks, where Internet plays an important role. This progress is placing the country on the information shores of the Pacific Rim.

## **1. THE 17th CENTURY TRADE WITH ASIA**

Those who have seen the Mexican "Hat dance" may remember the colorful dress of the China Poblana ballerina, where the national colors interwoven beautifully with spangle and other ornaments. This Mexican dress has a strong influence from the Far East, influence that came through Mexico's old trade with Asia, during the 16th and 17th century. While Europe struggled with the expansion of Islam, Mexico and the Philippines, two colonies of the Spanish Crown, traded goods made in different countries of Asia and minerals from Mexico [2]. This rather early trade with the Pacific Rim is an example of the possible influences that can be exchanged between nations, where libraries can take an active role using the invisible telecommunication grid that overcomes the geographical distances of the largest ocean on earth. In this paper, library development, automation, telecommunications, and networking activity between libraries in Mexico are discussed, focusing on the library networking capability of the country.

## **2. LIBRARY DEVELOPMENT**

Mexican "European type" libraries can be traced as far back as the 16th century, when the first monastic libraries were founded. However, modern libraries began their development in the late 1960's, when universities started the organization of collections and built new facilities. A federal public library program, on the other hand, was started in 1979 which coordinated and supported the creation of public libraries in every municipality and a central public library in the 31 states of the country. This program increased the number of public libraries from 1,500 to 5,400 centers in 20 years.

Most of the 450 special libraries date, as well, from the 1970s, when Mexico's industrialization was at its peak. The vast majority of companies lack a library or an in-house information service. It is estimated that there are 9,500 medium and large companies, a figure almost 20 times bigger than that of special libraries.

Table 1

<b>BASIC LIBRARY DATA - 1994</b> (Estimated data)		
	<b>Libraries</b>	<b>Volumes (millions)</b>
University	1,667	15
Special	448	
Public	5,410	22
School	4,400	16
Librarians	1,000	

Source: Salinas de Gortari, C. **Sexto informe de gobierno** [6].

Library progress in school libraries has been the most limited of all, lagging behind in numbers and in library organization. They are about 4,400 while there are more than 109,000 schools. However, it must be said that public libraries perform the role of school libraries, because most of their patrons are school children. This demand comes from the 22 millions children that attend elementary and secondary schools, a rather large figure for the country's school libraries number (See table 2).

University libraries, along with public libraries, are among the best organized. There are about 1,667 academic libraries that belong to state and public universities, as well to technological institutes. Most of the 1,000 mexican librarians holding a library degree work in this type of library (See table 1). The potential demand of academic libraries comes from 3.3 million students, a number which does not include the 256 thousand professors.

Despite the fact that the number of libraries is not enough to meet information demand, the progress achieved by the country has been outstanding in the last 20 years, especially if compared with other Latin American nations {4}.

Table 2

<b>Potential information demand - millions - 1994 [3,6]</b> (Estimated data)	
Population	87 millions
School children	22
University students	3.3*
Medium and large companies	9,500

\*Includes high school students

Source: Salinas de Gortari, C. **Sexto informe de gobierno...**[6].

### **3. LIBRARY AUTOMATION**

It is difficult to talk about library automation and networking due to the limited statistics and information available as well as the rapid changes that are taking place. Centers with the best progress are university libraries which have received special government funds for automation programs, helping them to be in the lead.

Universities began their computerization like other organizations, focusing their efforts on management aspects. Later, computers were assigned to the creation of computer laboratories, and finally, they were acquired for service departments, such as libraries.

Most universities have local computer networks (LANs) but integration of them into wide institutional networks is limited. LANs are found in most departments, including libraries, but they can not talk to one another. Few universities have a wide area network, exceptions are the National University (UNAM), the 26 ITESM campuses and some other leading private universities. State universities lag behind their private counterparts due to their faculties being spread over wide geographical areas. Present universities' efforts are in the layout of fiber optic networks.

In general, libraries are still isolated from the university campuses or sites where they are located. Their services are not yet campus wide, limiting access to remote electronic/digital information services or direct access to Internet.

The first library computers were placed in technical service areas. Most university libraries, if not all, have computers to process their information materials, but to a lesser extent have this equipment in public services. Only a few have automated circulation procedures. Number of terminals is also scarce in library offices. Computer literacy is, on the other hand, not enough among librarians.

Libraries have access to Internet, but it is usually through terminals located in the campus' computer centers. Despite this limited connectivity, university libraries have made more progress than other types. Special libraries, usually small, have automated catalogs and are less likely to have problems with connectivity to their parent computer networks. However, few private companies are part of national computer networks (4).

Public libraries lack computers for their management, but some offer computer courses or computer based information services to children. However, the national network of public libraries has centralized technical services in Mexico City, where books are acquired and cataloged with in-house software. School libraries are in even less favorable conditions. They lack computers, being at the bottom end in automation.

Connectivity among Mexican libraries is through their links with Internet, which rely on microwave dishes and satellite communication, it is seldom via fiber optic cable (5). This means that if libraries need to exchange electronic information it has to be through Internet links, but seldom through a direct line (See table 3).

Library investment in telecommunications and computer equipment is likely to slow down due to the present economic crisis in the country. Most of the information technologies are imported, therefore they doubled in price since December 1994.

Table 3

<b>LIBRARY COMPUTER PROGRESS</b>	
-	University libraries lead computer progress
-	Their present efforts are on integration of LAN's
-	Access to Internet is rapidly increasing
-	Government funds are specially provided for automation
-	Public and school libraries lag behind in computer equipment
-	Computer literacy is a great need in libraries
- 75	Universities with an Internet node
- 35	Gophers available
- 1986	First connection to Bitnet
- 5	Library catalogs

#### 4. PARTNERSHIP

There are a number of library networks which have a potential for cooperation with the international library community. The activities carried out by these networks are usually in shared acquisitions programs. This is the case of the five universities from the Bajio region. The Mexican Institute of Social Security (IMSS) and the Ministry of Health library network (CENIDS) which includes university medicine schools and government public hospitals [8]. Other networks are UNAM which has 180 libraries, with about 25% of the academic library holdings in the country.

Table 4

<b>MAIN LIBRARY CONSORTIA</b>	
ITESM	- 26 campus libraries spread all over the country
INEGI*	- A national network with 53 information centers
IMSS	- Coordinates 240 documentation centers
BAJIO	- Shared acquisition program of five universities
DGIT	- 120 S&T academic libraries
UNAM	- 180 research and academic libraries
RNB*	- Coordinates 5,410 public libraries
CENIDS	- Library consortium of medicine schools and hospitals
ENERGY	- Network of the 3 main energy libraries.
COMPAB	- Loose consortia of state university libraries

Instituto de Estudios Superiores de Monterrey (ITESM), the largest private higher education institution in Mexico, has 26 libraries spread all over the country connected to Internet. The National Institute for Statistics, Geography and Informatics has also 53 information centers along the Mexican territory. Public libraries (RNB), on the other hand, are coordinated by a central federal agency, which acquires and processes library materials, as well as setting up service standards and the training of personnel. The 37 state universities (COMPAB) have some kind of consortia at regional level and one at the national level (See table 4). These regional networks have shared acquisition programs and co-sponsored training programs. The national agency that coordinates the 107 technological institutes (DGIT) also have similar partnership in shared collection development.

## **5. ACADEMIC COMPUTER NETWORKS**

The integration of Mexican state universities into a single national computer network began in 1989 under the auspices of the Ministry of Public Education. The activities are directed by the University Network of Teleinformatics and Communications (RUTyC) which allocates funds under the scheme of two dollars for every dollar invested by universities. The large size of the country and the limited fiber optic cable grid force universities to rely on satellite data transmission. The first network was created with seven nodes distributed along the country's territory and connecting it to Internet, via the National University of Mexico (UNAM) node. This first network was expanded in 1990 to include the newly created Mexico City's metropolitan computer network. Each node of RUTyC is equipped with mini-computers servers via modem, using telephone lines to offer communication services.

During the same year of 1990, 35 VSAT antennas to transfer data were acquired, using the master satellite antenna of Telecomm, an agency of the Ministry of Communication and Transportation, and data transmission was standardized to use CISCO equipment. Two direct international Internet access points were also financed for the Northern border universities, Ciudad Juarez and Baja California, linking them to San Diego State University and to El Paso Community College, increasing to four the number of Internet international exit points. The first academic institution to connect its computers to a macro computer network, Bitnet, was ITESM in 1986, followed by UNAM two years later.

RUTyC has given support to university libraries, providing them funds to buy computer equipment, including modems and satellite antennas. It has also financed modems to Mexican researchers who belong to the National System of Researchers, a national body that provides grants and evaluates researchers production.

The Ministry of Public Education plans to have all state universities connected to a national computer network by 1997. If this networking expansion takes place, the country will have all state universities connected to Internet, since the leading private higher education institutions are already part of Internet. So far, out of 37 state universities, more than 35 have nodes to Internet, plus 40 nodes of private ones. However, there are 390 higher education institutions of all sorts, private and public, and small and large ones [1].

Table 6

<b>DATA TRANSMISSION AND INFORMATION VALUE ADDED COMPANIES</b>	
(Estimated data - 1994)	
Remote data processing	12
Access to remote databases	27
E-mail services	22
Videotext	4
Teletext	4
Switch data packed transmission	8

Source: Ministry of Communications and Transportation [7].

## **6. NEW OPEN MARKET POLICIES BENEFIT LIBRARIES**

Libraries have benefitted from Mexican new open market policies, since they have paved the way for modernization of telecommunications and therefore, new communications and more efficient services are available to libraries. There are more telephone lines available and the country is being wired with a fiber optic cable grid. The major cities are already part of this growing grid. Two new satellites were launched in the last two years, giving greater telecommunication capability to the country. The satellite coverage increased 120% since 1988. They cover nearly 30 countries in the Latin American continent [7].

Table 5

<b>TELECOMMUNICATION INFRASTRUCTURE - 1994</b>	
(Estimated data)	
Satellites	3
International earth dishes	14
Local earth satellite dishes	249
Working telephones channels	432
Video channels	6
Country satellite telephone coverage	29
Cellular telephone subscribers	450,000

Source: Ministry of Communications and Transportation [7].

The national territory is covered with 249 local earth dishes and 14 for international communication. There are 6 video channels, giving Mexico a lead in television coverage in the southern region of the continent. Standard telephones are 8.4 millions, which are 9.5 lines per 100 inhabitants, a number that is small if compared with North American figures. Due to this limitation, wireless communication is booming. There are more than 450 thousand subscribers to cellular telephones, a service provided in almost all cities and regions. The national network of fiber optic is of 13,500 kilometers, connecting 56 of the most important cities (See table 5). These urban centers have access to digital information services, such as voice, images and data. Another achievement by Telmex is its participation to finance transatlantic submarine cables, gaining access to 41 countries [7].

Telecommunications have enabled the country to develop a fast growing information industry. There are 12 companies that offer remote data processing and 27 provide access to remote databases. E-mail services have sprang up in just a couple of years. 22 companies have set up telecommunication networks to offer electronic mail to the private sector. Other related services are increasing in number, such it is the case of videotext with four providers and audiotext (See table 6). Larger corporations have been able to integrate their production chain with suppliers and customers, such is the case of the automotive industry, airlines and banks. The financial sector, like in other parts of the world, relies heavily on Mexico's telecommunication infrastructure. The present economic cash crisis is expected to limit the growth of the national information industry, but it will still outpace other industries, such as manufacturing.

## 7. CONCLUSIONS

Mexican modern library development is recent. It dates from the late 60's when libraries started to achieve greater progress. Automation efforts, on the other hand, started in most libraries during the late eighties with the support from federal government programs. Technical services are probably the most automated functions in the libraries. Despite this development, libraries lack, in most cases, connectivity to their parent institutions. However, academic organizations have as a priority to develop campus wide area networks and to link them to Internet.

There are about 75 universities with nodes to Internet. Some, about 28, have created gophers to offer local or institutional information. Libraries have started to catch up with computer literacy and Internet navigation techniques. Five university libraries offer their online catalogs available to the digital community of Internet. Other types of libraries are not part of this macro network yet. However, networking in the traditional sense of cooperation and coordination of libraries is and has been present in Mexican libraries for years. Besides the national public library system, there are about 10 networks integrated by special and university libraries.

The connection to Internet offers a potential venue for international cooperation between Mexican libraries and libraries from the outside world, such as those from the Pacific Rim. Mexico's telecommunication progress has placed the country in the shores of the Pacific Rim. Now, Mexican libraries have to increase their communication with libraries from the fast growing economies of Asia, Australia and the Americas.

Libraries do have to be ready to take part in the new cultural impact of trade among countries located in the shores of the Pacific, an ocean larger than all continents on earth, but small for the telecommunication lines available to the world of libraries

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